

PLANS FOR SUSTAINING AND DEVELOPING GENETICS
AT THE UNIVERSITY OF WISCONSIN

1. The Importance of Genetics

Genetics, although a comparatively new science, occupies a central place among the biological sciences. The theory of evolution by natural selection, propounded a century ago, first brought the organic world under one point of view. Similarly genetics provides the basis for a unified approach to the unique properties of the living substance by having disclosed a common pattern in the germinal material. It has become a pivotal area within the natural sciences, by bringing physics, chemistry, mathematics and biology together in the study of the material basis of life. The importance of genetics is further attested by the fact that it has been listed by the National Institutes of Health as an area of critical personnel shortage.

The many practical applications of genetics to agriculture have long been recognized. Hybrid corn, disease resistant and high yielding varieties of economic plants, and improved livestock are familiar to everyone as examples of the successful application of genetic methods. In addition to its contributions to agriculture, genetics may be expected to have new applications in other areas, especially in medicine. There is great interest now in the biological effects of radiation, and we may note how fortunate it is that the genetic effects of high-energy radiation were discovered before the development of atomic energy; otherwise man would be in danger of unwittingly doing harm to his genetic future. The discoveries that the principles of genetics apply in bacteria and in viruses have made notable contributions to the theory of genetics. They have also made possible a much deeper understanding of disease producing organisms and provide a rational basis for

synthesis of strains useful for vaccines and for the production of antibiotics. Recent work on immunology, tissue transplantation and tissue cultures have not only increased theoretical knowledge, but already have had important medical applications in such things as blood transfusion and tissue grafting.

Finally, one of the implications of the theory of evolution is that man himself is evolving, and that his future biological development is in his own hands. Any thoughtful consideration of man's long range future will have to take his own genetics into account.

2. The Growth of Genetics at the University of Wisconsin

Wisconsin was the first University in the United States to found a separate Department of Genetics. From its beginning in 1910 with one staff member it has grown to its present size of 16 persons of professorial rank, 10 full time and 6 jointly appointed with other departments. During these years more than 160 graduate students have been awarded doctorates. Included among these are many who have had careers of distinction in research, teaching, and service to science and agriculture.

The University of Wisconsin has become recognized as one of the outstanding centers of genetics research and teaching in the world. Among the more than 600 technical publications from this group are several that are landmarks in the history of genetics and natural science. Included in the present membership of the Department are three former presidents of the Genetics Society of America, the president of the recent International Congress of Genetics, four members of the National Academy of Sciences, four who have been managing editors of professional journals, recipients of several honorary degrees and awards including the Nobel Prize, the Kimber Award, the Walden Medal, the Elliot Medal, the Lewis Prize, the Pasteur Award, the Harvey

Lectureship, the Borden Award, the past presidents of the Society for the Study of Evolution, the Society of Naturalists, American Society of Zoologists, American Society of Animal Production, and the Potato Association of America.

3. Organization of Genetics

There was a single Department of Genetics at the University of Wisconsin until 1957, at which time a Department of Medical Genetics was organized in the Medical School in response to the growing importance of genetics as a basic medical science. At present the working relation between these Departments is very close, and we believe it is imperative to maintain this in the future.

To this end the members of the two Departments have agreed to an informal divisional organization, whose purpose is "to foster the continued and unified development of genetics at the University of Wisconsin, with particular emphasis on research and training in fundamental genetics." This alliance does not alter the legal responsibilities of the Departments or their relationship to the Colleges. It does seek to achieve the unity of policy and operation in the field of genetics that we consider of prime importance.

We recommend that the Division of Genetics be continued with its present organization and purpose.

4. The Limitations of the Present Genetics Program

It is our conviction that the eminence of teaching and research of genetics at the University of Wisconsin must be maintained and strengthened. It will not be possible to remain in the forefront of the field merely by maintaining the status quo. It has been characteristic of genetics, in the last decade especially, to open up and develop new areas. This will require

new staff, new techniques, and new facilities (often elaborate chemical installations not previously necessary).

The University of Wisconsin has suffered a serious loss to its leadership in genetics by the resignation of Dr. J. Lederberg. If the University is to retain its foremost position it is essential that the program in genetics of microorganisms be continued and developed.

Within the next ten years five members of the staff of the Department of Genetics will have retired. If they are to be replaced with others of comparable eminence it will be necessary to have much better facilities. There are three reasons for this: (1) Research in agricultural phases of genetics is assuming more and more the precision and detail of a laboratory science, and along with other developments in genetics requires more extensive laboratory facilities; (2) Our present staff members have worked for years with substandard equipment and space; (3) The curriculum in genetics has expanded and a program for the adequate training of geneticists requires more laboratory experience than we can now provide.

In the past, undergraduate teaching of genetics was largely for majors in agriculture or biology. With the increased public awareness of the importance of genetics, we believe that it must play a larger role in general education. To meet this need a non-professional course in genetics is now being offered and a substantial segment of the I.L.S. Biology Program is devoted to genetics.

5. Inadequacy of the Present Genetics Building

The Department of Genetics needs more space and better facilities even to maintain its present program and personnel.

The Department has occupied essentially the same quarters since 1932 when it moved into the building formerly occupied by the Agronomy Department.

For many years the space (now about 12,600 square feet) and facilities in the Genetics Building have been inadequate. From time to time the needs of the Department have been met in part by expansion and remodelling in the Genetics Building and by finding temporary, and often unsatisfactory space elsewhere. At present five persons have to do part of their laboratory work outside the genetics building in "borrowed" space. There is no space in the present building for an adequate chemical laboratory, a serious drawback for the modern study of genetics.

It is important to emphasize also the extent to which the Department's teaching program has been curtailed by the lack of sufficient classroom and laboratory space. Several years ago the laboratory for elementary genetics was crowded out of the building, and has now been discontinued. No laboratory course in genetics, graduate or undergraduate, is taught in the Genetics Building. It is important for adequate training in genetics to offer laboratory work in immunogenetics, cytogenetics, *Drosophila* genetics and genetics of microorganisms, preferably in the same building where genetics research is being done. At present none of these laboratory courses is offered because of lack of staff or facilities, or both.

Late in 1957 a new animal research laboratory for Genetics was completed to replace a building destroyed by fire. Although this did not increase available space, it was a great improvement in quality and efficiency, compared with the previous facilities. The completion of the new wing of the Service Memorial Institute will provide, late in 1959, about 4000 square feet for research in the Department of Medical Genetics. However, even with this, the total facilities available still will be inadequate and will become more so in a few years.

6. Space Plans

If teaching and research in genetics at Wisconsin are to retain their present position of leadership it is absolutely necessary that more space and improved facilities be provided. Not only is the present limitation of space critical, but the existing fragmentation of the genetics group makes a unified program almost impossible. Teaching and research activities are now housed in six different buildings. The only satisfactory solution to furnish the needed facilities and at the same time foster a unified program is a building in which the entire genetics group can be brought together.

Therefore we recommend that a Genetics Building be built, large enough to provide for both teaching and research in the Departments of Genetics and Medical Genetics and also to allow for growth. This would require a building of approximately 60,000 square feet.

7. Staff Needs

For the immediate future appointments in the following fields are recommended (without regard to order):

Genetics of microorganisms (replacement for Dr. Lederberg)

Cytogenetics

Biochemical genetics (jointly in Genetics and Biochemistry)

Genetics of histocompatibility or tissue culture (Medical Genetics)

Mammalian developmental genetics (with collateral relation to livestock breeding).

We do not intend to set down now what the long term directions for growth should be except to indicate that research in genetic principles and research basic to plant and animal improvement and medicine should all be strongly represented in the future development of genetics at the

University of Wisconsin. Although we can confidently predict the growth of genetics, we cannot predict the specific areas where this will occur. For example, the large program in microbial genetics would not have been foreseen 15 years ago. Any long range plans must allow for the possibility of new positions, with adequate space for laboratory facilities so that new areas may be developed as they appear.

Appendices

- Appendix 1. A history of genetics at Wisconsin.
- Appendix 2. The Division Organization.
- Appendix 3. Statistics on space allocation. Square footage in different buildings at present time.

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